Journal of Cardiology (2011) 58, 165—172

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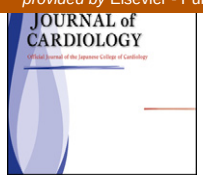

Original article

Rationale and design of the Japanese Heart Failure Outpatients Disease Management and Cardiac Evaluation (J-HOMECARE)

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Received 12 April 2011; received in revised form 18 April 2011; accepted 21 April 2011

KEYWORDS
Heart failure;
Disease management;
Psychological status;
Prognosis;
Quality of life

Summary
Background: Although many studies have demonstrated the efficacy of disease management programs on mortality, morbidity, quality of life (QOL), and medical cost in patients with heart failure (HF), no study has focused on psychological status as an outcome of disease management. In addition, very little information is available on the effectiveness of disease management programs in other areas than the USA and Europe.
Methods: The Japanese Heart Failure Outpatients Disease Management and Cardiac Evaluation (J-HOMECARE) is a randomized controlled trial in which 156 patients hospitalized with HF will be randomized into usual care or a home-based disease management arm receiving comprehensive advice and counseling by visiting nurses during the initial 2 months and telephone follow-up for the following 4 months after discharge. This study evaluates depression and anxiety (Hospital Anxiety and Depression Scale), mortality, readmission due to HF, and QOL (Short Form-8). Data are collected during index hospitalization and then 2, 6, and 12 months after discharge. This study started in December 2007, and the final results are expected in 2011.
Conclusion: The J-HOMECARE will provide important information on the efficacy of disease management for psychological status as well as the effective components of disease management for patients with HF. (ClinicalTrials.gov number, NCT01284400).

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0914-5087/$ — see front matter
doi:10.1016/j.jjcc.2011.04.004

Introduction

Heart failure (HF) is one of the leading causes of death and hospitalization in developed countries. It is often associated with multiple co-morbidities and complications, as well as impaired quality of life (QOL). Although many therapeutic options have reduced mortality and morbidity in patients with HF [1—4], frequent re-hospitalization due to worsening HF, low QOL [5], and psychological problems remain a critical issue [6]. Our previous studies demonstrated that poor follow-up as well as psychosocial distress such as anxiety was an independent predictor associated with hospitalization due to worsening HF [7,8].

To improve outcomes of HF patients, a variety of disease management programs have been developed and tested over the past 25 years [9—11]. These programs include HF clinics, home-based intervention, and tele-monitoring. The key components of all of these interventions were education and counseling, symptom monitoring by a nurse, accessibility of healthcare provider in case of problems, optimization of medication, and social support service after discharge. They have been reported to decrease rehospitalization due to worsening HF, increase time to first major event, decrease medical costs, and improve QOL [12]. However, some studies have failed to support these positive findings, by reporting negative or inconclusive results [13,14]. In addition, the differences in national healthcare systems raise questions about the suitability and comparability of these programs in different countries. To the best of our knowledge, no trials have been conducted to evaluate the effect of disease management programs in other countries other than the USA, Europe, and Australia. Moreover, almost all previous studies have evaluated the effects of disease management on mortality, readmission due to HF, QOL, and medical costs. Even though psychosocial distress, including depression and anxiety, is common among patients with HF and is a high risk for mortality and morbidity in HF [8,15], there is no trial to assess the efficacy of disease management programs for the psychosocial status of HF patients.

The Japanese Heart Failure Outpatients Disease Management and Cardiac Evaluation (J-HOMECARE) is a randomized controlled trial to evaluate the efficacy of home-based disease management programs compared with usual care in improving psychosocial status, mortality, HF hospitalization, and QOL in Japanese HF patients.

Study design

Overview

J-HOMECARE is a multicenter, randomized, efficacy trial designed to evaluate the efficacy of home-based disease management programs on psychosocial status and QOL as well as mortality and morbidity as compared to usual care in Japanese HF patients. This study has been approved by the Ethics Committee of Hokkaido University Graduate School of Medicine. Recruited patients with HF were randomized into usual care and home-based disease management groups between December 2007 and March 2010. Patients undergo their respective J-HOMECARE treatment for 6 months and are then followed up for an additional 6 months. All data collection was scheduled to end in March 2011.

Study objectives

The primary objective of J-HOMECARE is to determine the effectiveness of interventions, as compared to that of usual care, on psychological status, including depression and anxiety, in HF patients. The secondary objective is to determine the effectiveness of interventions, compared to that of usual care, on all-cause death, cardiac death, sudden cardiac death, readmission due to decompensated HF, and QOL.

Study patients and baseline assessment

The process of the trial is shown in Fig. 1. All study candidates are required to have had a hospital admission for HF with symptoms and signs of HF and a pre-existing history of chronic HF [New York Heart Association (NYHA) II—IV]. Eligible patients must be at least 18 years of age. Reasons for exclusion from the study are as follows: end-stage HF defined as requiring mechanical support or continuous intravenous inotropic support; a serious life-threatening illness with a life-expectancy of <6 months; stroke within the last 3 months; cognitive dysfunction; substance abuse or psychotic disorder; patients whose physician or nurses refused access.

After informed consent has been obtained from eligible patients, they are randomized on a 1:1 basis, to either usual care or a home-based disease management program.

Baseline and all annual examinations consist of: (1) clinical characteristics including height, body weight, pulse, and blood pressure; (2) etiology of HF; (3) risk factors such as hypertension, diabetes mellitus, dyslipidemia, smoking habits, and/or alcohol drinking habits; (4) comorbidities such as prior myocardial infarction (MI), atrial fibrillation, ventricular arrhythmias, hyperuricemia, chronic kidney disease, anemia, stroke, chronic obstructive pulmonary disease, locomotor disability, prior percutaneous coronary intervention (PCI) or coronary artery bypass graft (CABG); (5) severity of HF [NYHA functional class, brain natriuretic peptide (BNP)], and echocardiography; (6) treatment at hospital discharge; and (7) a questionnaire assessing depression, anxiety, QOL, and physical activity (Table 1).

Intervention protocol

Enrolled patients receive comprehensive discharge education using a booklet provided by a cardiologist, nurse, dietitian, or pharmacist. This booklet provides knowledge and information on pathophysiology, medical treatment, diet, physical activity, lifestyle modification, self-measurement of body weight, self-monitoring of worsening HF, and emergency contact methods (Fig. 2). Follow-up assessments were performed 1, 2, 6, and 12 months after discharge.

A home-based disease management program consists of home visit by nurse to provide symptom monitoring, education, and counseling and telephone follow-up by nurse in addition to routine follow-up by cardiologist (Table 2). A home visit is made within 14 days after discharge from

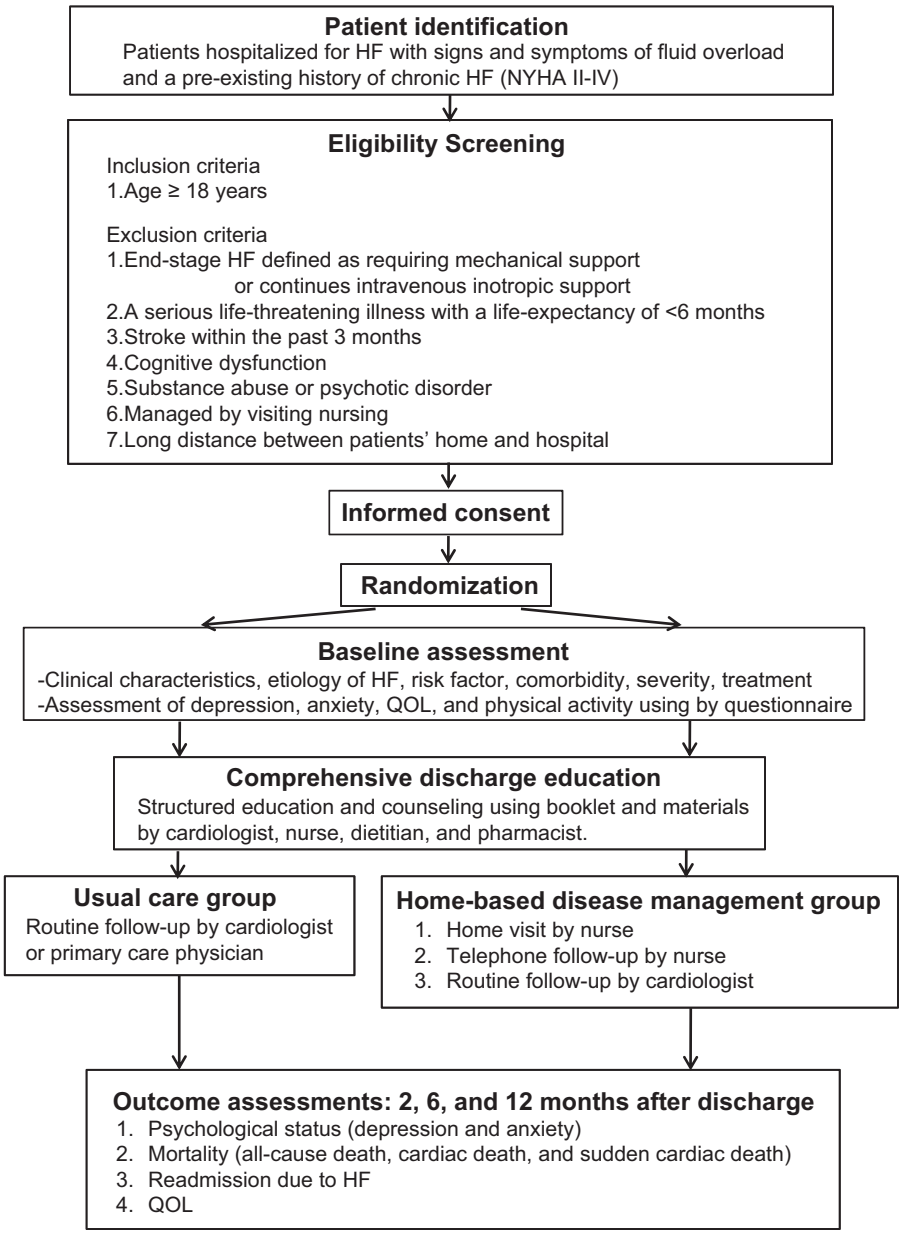

Figure 1 Study protocol of J-HOMECARE. HF, heart failure; NYHA, New York Heart Association; QOL, quality of life.

the hospital. The nurse visits the patient's home to assess how the patient is coping in the home environment, HF status, general health status, adherence to medication, lifestyle modification, daily activity, and social support needs (Table 3). Home visits are made once per two weeks until 2 months after discharge. After the conclusion of home visiting, the nurse conducts telephone follow-up once a month until 6 months after discharge (Fig. 3). Nurses monitor HF symptoms, patient's general health status, and the need of other health and social support (Table 4). The

Table 1 Questionnaires used in the J-HOMECARE study.

	Assessment schedule	Questionnaire
Depression	Baseline, 1, 3, 6, and 12 months	Hospital Anxiety and Depression Scale
Anxiety	Baseline, 1, 3, 6, and 12 months	Hospital Anxiety and Depression Scale
Quality of life	Baseline, 1, 3, 6, and 12 months	Medical outcome study Short Form-8
Physical activity	Baseline, 1, 3, 6, and 12 months	Specific activity scale

Table 2 Components and contents of the home-based disease management program during home visits.

Components	Contents
Coping in the home environment	Advice on how to adapt patients' current lifestyle to accommodate recommended changes Assessment and support of mismatch between physical disability and home environment
HF status	Assessment of HF-related symptoms, daily weight, and vital signs Consultation with cardiologist, if needed
General health status	Assessment of comorbidity, psychosocial response, and activity of daily living Consultation with cardiologist or other health professional, if needed
Adherence to medication	Assessment of coping with regimen Advice on effective coping strategy Assessment of side effects Support to caregiver's optimal monitoring for patient's adherence Consultation with pharmacist or cardiologist, if needed
Lifestyle modification	Advice on sodium restriction, fluid restriction, alcohol restriction, and smoking cessation Consultation with dietician or cardiologist
Daily activity	Assessment of work, daily, and leisure activity
Social support needs	Assessment of inadequate social support and social isolation Consultation with social worker, if needed

HF, heart failure.

Figure 2 Photos of patient education booklet. (A) Booklet and check list of body weight. (B) A page of the booklet.

nurse consults a multidisciplinary team during the intervention period to optimize her advice for each patient. This multidisciplinary team consists of a cardiologist, dietician, pharmacist, and social worker. Other healthcare professionals are consulted, as required.

Patients in the control group receive usual care and follow-up. After hospital discharge, patients assigned to the usual care group continue to receive routine management by the cardiologist. No extra follow-up by a HF nurse or multidisciplinary team is provided. Patients are treated according to the current guidelines for HF management by standard medications.

Endpoints

The primary end point is the change in psychological status including depression and anxiety. We assess the change in the prevalence of depression and anxiety and the change in the score of the Hospital Anxiety and Depression Scale (HADS) from baseline to 12 months after discharge [16]. A change in the QOL score is assessed by the Short Form-8. Patients' QOL, psychological status, and physical activity are assessed in the outpatient clinic or by mail at 2, 6, and 12 months after discharge (Table 1).

The secondary endpoint is the time to the first event (all-cause death, cardiac death, sudden cardiac death, or hospitalization for HF). Hospitalization for HF is defined as an unplanned overnight stay in a hospital (different dates for admission and discharge) due to progression of HF or directly related to HF. Data are collected by chart reviews or interview to the patient.

Statistical analysis and sample size

All analyses are conducted according to the intention-to-treat principle. Data from all randomized patients will be analyzed according to the treatment assignment. Baseline characteristics will be compared between the 2 treatment arms to assess covariate balance, and any imbalances will be adjusted in multivariate models. To meet the primary objective of the study, the primary endpoint, the change

Table 3 Check list of patient status during home visit.

Vital Sign	Blood pressure	___/___mmHg
	Heart rate	___/min
	Breaths per minute	___/min
Heart failure symptoms	Dyspnea/Shortness of breath	Yes/No
	Paroxysmal nocturnal dyspnea	Yes/No
	Orthopnea	Yes/No
	Cough/Sputum	Yes/No
	Fatigue	Yes/No
	Oliguria/Nocturia	Yes/No
	Coldness of limbs	Yes/No
	Palpitation	Yes/No
	Edema	Yes/No
	Anorexia	Yes/No
	Insomnia	Yes/No
Body weight	Self-measurement of body weight	Yes/No*
	Body weight	___/kg
	Body weight change from baseline	___/kg
Life style modification	Adherence to sodium or fluid restriction	Yes/No*
	Excessive activity	Yes/No*
	Physical or mental stress	Yes/No*
	Infection prevention	Yes/No*
	Alcohol restriction	Yes/No*
	Smoking cessation	Yes/No*
Adherence to medical regimen	Poor	Yes*/No
	If yes, name and number of missed drugs	
Social support	Need for additional specialized care	Yes*/No
	Need for other social resources	Yes*/No
Report to primary physician	Need for additional education or support	Yes*/No
	Appointment of next clinic visit	Yes/No
	Need for immediate emergency room/clinic visit	Yes/No

* Require additional education or support for patient or families/caregivers.

in psychological status between baseline to 12 months after discharge, will be evaluated using the paired *t*-test, and multivariate modeling will be analyzed using logistic regression. To assess the secondary endpoint, event rates of death and readmission over time will be summarized using Kaplan—Meier survival curves, and differences in these curves by the intervention will be analyzed using the Mantel—Haenszel (log-rank) test. In addition, a Cox proportional hazard model will be fitted for a multivariate analysis. A *p*-value below 0.05 will be considered as statistically significant and the incidence curves will be considered to be confirmed as different.

The sample size is based on the assumption that the disease management program will produce a 30% reduction in the primary outcome, relative to the control usual care arm, from the results of previous similar trials for patients with MI or HF [17,18]. Previous nurse-led, behavioral intervention studies improved scores for depression and anxiety by a range of 30—40% [17,18]. It was calculated that 156 subjects (78 in each group) will be required to detect a 30% reduction in events (power of 80%, alpha of 0.05) in the disease management group, and dropouts and losses were estimated to be approximately 20% over the duration of the trial.

Discussion

J-HOMECARE is designed to determine the efficacy of disease management on psychosocial status in HF patients. Depression is known to obstruct active participation in lifestyle modification and symptom recognition required for taking appropriate action in case of worsening symptoms [19]. Moreover, depression and anxiety increase risks of mortality and readmission in patients with HF [8,20]. However, psychosocial problems are both underestimated and undertreated in HF patients [21,22]. Nurse-led intervention in MI patients has been reported to reduce psychological distress [23], whereas no previous studies have evaluated their effectiveness in disease management programs for psychological disorders in HF. If this study proves their effectiveness for psychological disorders, they could play an important role in improving psychosomatic symptoms, and could eventually improve clinical outcomes.

The significance of J-HOMECARE conducted in Japan is also designed to determine the clinical value of a disease management program across the country and healthcare system. With a rapidly growing aging population in developed countries, this trial will be able to explain how these management programs can be effective for universal strate-

Table 4 Components and contents of the home-based disease management program in telephone follow-up.

Components	Contents
HF status	Assessment of HF-related symptoms, daily weight Consultation with cardiologist, if needed
General health status	Assessment of comorbidity, psychosocial response, and activity of daily living Consultation with cardiologist or other health professional, if needed
Adherence to medication	Assessment of coping with regimen Assessment of side effects Support to caregiver's optimal monitoring for patient's adherence Consultation with pharmacist or cardiologist, if needed
Lifestyle modification	Advice on sodium restriction, fluid restriction, alcohol restriction, and smoking cessation Consultation with dietician or cardiologist, if needed
Social support needs	Assessment of inadequate social support and social isolation Consultation with social worker, if needed

HF, heart failure.

gies for HF, regardless of the differences in ethnicity and healthcare systems.

In J-HOMECARE, visiting nurses provide advice and counseling regarding coping in the home environment, healthcare and social support, and future healthcare needs for 3 months after discharge. Based on previous studies, the elements of disease management programs for HF consist of 4 categories: (1) symptom monitoring; (2) therapeutic modification; (3) patient education; and (4) patient adherence [24,25]. In a growing aging population, elderly patients living with HF have complex problems, such as living alone, having an elderly caregiver, or having a mismatch between disability in the instrumental activities of daily living (IADL) and life circumstances. These problems interfere with their adherence to and maintenance of optimized medical treatment [26]. Therefore, the comprehensive advice and support of J-HOMECARE may play an important role in enhancing the various elements of disease management programs.

In conclusion, J-HOMECARE is a multicenter, randomized trial analyzing the impact of home-based disease management programs on the psychological status as well as prognosis and QOL of HF patients in Japan. It is the first trial carried out in Japan to analyze the effect of disease management on clinical outcomes for Japanese patients and is expected to prove its effectiveness in disease management irrespective of the national health service system. Moreover, our intervention has both multidisciplinary and comprehensive features including continuing support to manage patients' complex problems and enhance their self-care and adherence. Results from this trial will help healthcare providers to determine the effective components of an HF management program.

Funding

J-HOMECARE is supported by grants from Health Sciences Research Grants from the Japanese Ministry of Health, Labour and Welfare (Comprehensive Research on Cardiovascular Diseases), the Japan Heart Foundation, and the Pfizer Health Research Foundation.

Conflict of interest

Hiroyuki Tsutsui has received research support from Novartis and honoraria for lectures from Shionogi, Daiichi Sankyo, Tanabe-Mitsubishi, Novartis, MSD, Pfizer, Takeda.

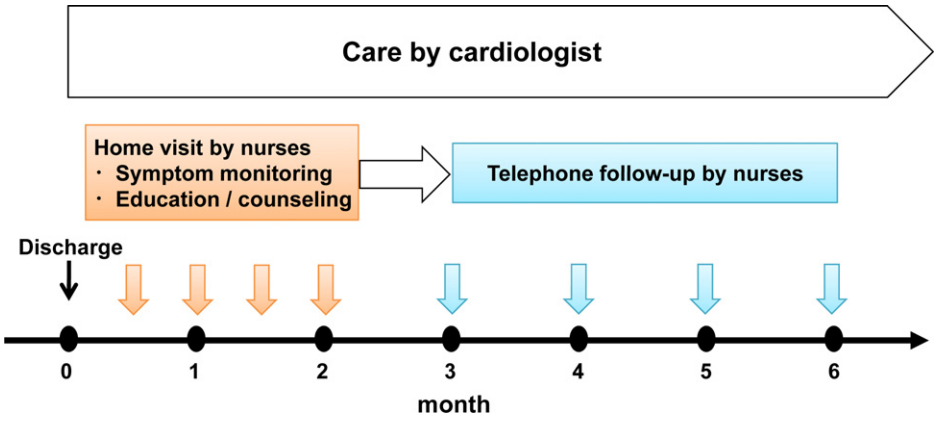

Figure 3 Algorithm of home-based disease management.

Appendix

Steering Committee

Hiroyuki Tsutsui (Chair), Miyuki Tsuchihashi-Makaya (Co-chair).

Endpoint Adjudication Committee

Members: Takayuki Inomata, Shintaro Kinugawa, Kenichi Sugioka.
Assistant: Mayumi Koasa.

Data and Safety Monitoring Committee

Members: Hisashi Kai, Tomomi Ide.
Assistant: Erina Ninomiya.

Investigators:

Hisashi Matsuo, Toru Kaji, Yoshiko Nishino, Reiko Omi, Noboru Asai, Mizue Takahashi, Shigeo Kakinoki, Chika Takagi, Kazuhiko Nagai, Miki Takeuchi, Shuko Uchionbou, Shigeru Takechi, Atsuko Namikoshi, Masumi Sakurada, Masumi Furuya, Yuki Heishi.

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